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The proposal stated by Mr. De La Rue of combining the employment of the spectroscope with the use of absorbing media, refers probably to a method I proposed for rendering the *forms* of the prominences visible in the spectroscope. In a Note to the Royal Society, *Proceedings*, vol. xvii. p. 302, I showed that by using a wide slit, the forms of the prominences could be seen directly ; and I then proposed using a deep red glass before the eye-piece of the spectroscope for the purpose of relieving the eye from the glare, which, under some circumstances, is painful, when a wide slit is employed.

On Spectroscopic Observations of the Transit of Venus in 1874.

By R. A. Proctor, B.A.

At the last Meeting of this Society it was mentioned that the American observers had suggested that spectroscopy should be applied to the observation of the approaching transits of *Venus*. It had been noticed during the total eclipse of last August that the approach of the Moon to the Sun's disk was rendered sensible before the actual commencement of the eclipse by the obliteration of the bright lines of the chromosphere; and the American astronomers suggest that the same might be the case when *Venus* is approaching the Sun's disk in 1874.

I think Mr. Huggins gave a practical character to this suggestion by pointing out that, although there would be difficulties in the method, applied merely to determine the motion of *Venus* over the chromosphere, yet that, as giving a means of preparing the observer for the occurrence of external contact, the method would perhaps be valuable. It is clear that this is, in fact, the only sort of observation which would have any value, since the chromosphere is not an envelope of uniform depth, and *Venus*, as seen from different parts of the Earth's surface, would appear to cross different parts of the chromosphere.

There is a further objection which I pointed out at the last Meeting in the fact that *Venus* approaches the Sun's limb not at a right, but at an exceedingly acute, angle, and that, as we do not know certainly the point of contact, we cannot tell the angle at which *Venus* will cross the limb.

Further, the stations best suited for observing internal contacts are not all suited for the particular mode of observation proposed by the American astronomers. At Crozet Island, for example, where internal contact most retarded can be most favourably seen, the Sun will be close to the horizon when *Venus* is traversing the chromosphere.

Passing over this last objection, which applies equally to egress and to ingress, it will be clear that Mr. Huggins' excellent suggestion that the passage of *Venus* over the chromosphere can be made the means of determining with extreme exactitude, the moment of external contact, can be applied satisfactorily to ob-

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servations of *Venus* in egress, since the observer can follow the planet across the Sun's limb with perfect certainty as to the point of last contact.

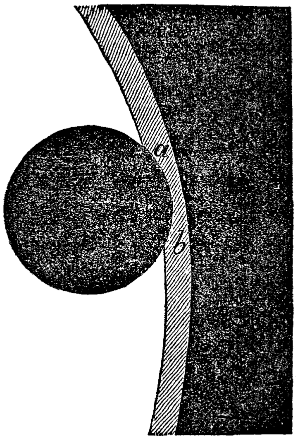
It has occurred to me that the method of observing the prominences by means of an open slit (high dispersive power being used) might be adopted with advantage for determining the moments not only of external, but of internal contacts.

It is clear that so far as external contacts are concerned, any method which rendered the prominences and the chromosphere visible would serve to exhibit the passage of *Venus* over these objects, and so to indicate with extreme exactitude her first contact with the Sun's limb. I would invite particular attention to the extreme slowness with which, in 1874, *Venus* crosses the limb of the Sun. In a paper which appeared in the Supplementary Number of the *Monthly Notices*, I called attention to certain effects of this peculiarity. According to ordinary modes of observation these effects would be disadvantageous, though they are compensated by other advantages. But, according to the suggested mode of observation, the slowness with which *Venus* approaches the Sun's limb would be a great advantage. If we assign to the chromosphere an apparent height of about $10''$, *Venus* will occupy about 4½ minutes in crossing that envelope, and this would afford the observer ample time to search for her. At egress, of course, it would be quite easy to follow the motion of her disk across the chromosphere.

In this plan the direction of the open slit would be at right angles to the Sun's limb; and it will be very obvious that internal contacts could be watched in the same way, and, perhaps, with more exactitude than by the ordinary method.

But it has occurred to me that internal contacts might be observed with advantage in a different manner, and probably Mr. Huggins had some similar plan in his thoughts, when at the last Meeting he suggested the use of a tangential slit.

If the open slit were placed tangentially, so as to include the solar cusps *a* and *b*, it is very clear that there would be seen two solar spectra separated by a dark space across which could lie the image of the chromosphere, which, however, would not be visible, owing to the brightness of the solar spectra. As *Venus* gradually moved from the Sun's limb the two solar spectra, or at least their inner edges, would appear to approach, and at the moment of real internal contact the dark space between them would disappear.



I think the moment of internal contact might thus be determined much more exactly than by direct observation. Of course, the method in reality amounts to changing the points of the cusps into parallel

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lines and determining the moment at which these lines become coincident. But it seems obvious that, so far at least as optical difficulties are concerned, an observation of this sort would be much more easily made than an observation of "the breaking or formation of the dark ligament."

This method is clearly applicable to egress also, and applies as well to Halley's as to Delisle's method. The best stations for applying it are those referred to in my paper in the *Monthly Notices* for last June.

Nov. 22, 1869.

On a Change in the Colour of the Equatorial Belt of Jupiter.

By John Browning.

For several years I have been in the habit of observing *Jupiter* with considerable regularity with reflectors of large aperture. On every occasion previous to this presentation, the equatorial cloud-belt has been without colour, and the brightest portion of the disk of the planet. During the month of October this cloud-belt has, however, constantly been of a strong, greenish yellow, and darker than the bright belts north and south of it. The colour is almost exactly that known to artists as yellow lake. The colours of various parts of the disk I take from my observatory note-book.

Oct. 9th, 9·30.—Equatorial belt strong yellow lake, the other bright belts colourless. Dark belts very warm grey, and faint coppery red. The poles of the planet ashy blue. The drawing I have the honour of exhibiting represents the planet as it appeared at this time.

Two or three persons quite unused to the telescope noticed the colour of the equatorial belt.

Oct. 11th.—Observed *Jupiter* with Mr. Proctor. Colours the same, but the greenish-yellow belt was covered with white spots. Mr. Proctor agreed with me as to the greenish yellow of the equatorial belt and the ashy blue of the poles, but could not see the red in the dark belts.

In all instances I used 12 inches aperture and a power of 148, *achromatic* eye-piece.

I have received a letter from Mr. Brindley, of Lewisham, from which I give an extract:—"With reference to the appearance of *Jupiter*, I last night spent some hours with the $8\frac{1}{2}$-inch telescope turned on him. I was most agreeably surprised; the belts were so different to what I had seen them before. The dark ones of a dark lake colour, the bright one of a lovely tinted green." As this letter was written some days after my drawing was made, and the writer had not seen the drawing, I cannot be much mistaken in the colours I have ascribed to the various portions of the planet.

Two years since I saw a coloured drawing of *Jupiter* at Mr. De La Rue's Observatory at Cranford. In this drawing, if my memory serves me, the equatorial belt was colourless.